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10/562,643	12/28/2005	Satoshi Hirata	520.45750X00	8472

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EXAMINER	
FETZNER, TIFFANY A	

ART UNIT	PAPER NUMBER
2859	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/562,643	HIRATA ET AL.	
	Examiner	**Art Unit**	
	Tiffany A. Fetzner	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/28/2005*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on **12/28/2005** is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement of **12/28/2005** has been considered by the examiner and is attached to this office action.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1-6** are rejected under **35 U.S.C. 102(e)** as being **anticipated** by **Moriguchi et al.,** US patent application publication 2005/0033153A1 published Feb. 10^{th} 2005, with an effective US priority date of April 25^{th} 2003.

6. With respect to **Claim 1**, **Moriguchi et al.,** teaches and shows "A magnetic resonance imaging system" [See figure 9] "comprising: means which generates a static magnetic field;" [See basic magnetic field generator 92 of figure 9] "gradient magnetic field generating means which generates a gradient magnetic field;" [See the gradient coils 96 of figure 9] "RF magnetic field generating means which generates an RF magnetic field;" [See Rf antenna 106 of figure 9.] "measuring means which measures a

magnetic resonance signal generated from a target;" [See the combination of the RF transmission reception unit 102, with image computer 108 and control computer 104 of figure 9.] "computing means which performs a computation on the magnetic resonance signal;" [See the combination of the image computer 108 and control computer 104 of figure 9.] "memory means which stores the magnetic resonance signal and the result of computation by the computing means;" [See paragraph [0084]] "and sequence control means which sets operating conditions to respective portions of the gradient magnetic field generating means"[See the combination of the control computer 104 gradient coil supply 98 the RF transmission reception unit 102 and the image computer 108 which interact to control the gradient coils 96.], **Moriguchi et al.,** teaches and shows that "the RF magnetic field generating means, the measuring means, the computing means and the memory means to control the operations of the respective portions, wherein the sequence control means includes control to irradiate the target with the RF magnetic field at least once, measure the magnetic resonance signal generated after the irradiation of the RF magnetic field in a state in which the strength of application of the gradient magnetic field is approximately zero, and calculate magnetic resonance spectrum information from the measured magnetic resonance signal to thereby perform a magnetic resonance spectrum measurement," [See figures 1, and 9, paragraphs [0007] through [0014],paragraphs [0082] through [0084]. The examiner notes that figure 1 shows that the 1st and 2nd or more RF pulses applied may occur when the gradient is approximately zero because no gradients are indicated as being present in figure 1.] **Moriguchi et al.,** teaches and shows that "wherein the sequence control means performs control (1) to measure a first magnetic resonance signal generated from a measurement voxel at the magnetic resonance spectrum measurement at a first time interval," [See paragraphs [0010]-[0014], [0033]-[0037] and [0082]-[0084]] "(2) to detect a magnetic resonant frequency F1 of water from a first magnetic resonance spectrum obtained" [See paragraphs [0033] through equation 6 in paragraph [0037] "by Fourier-transforming the first magnetic resonance signal" [Se paragraph [0082]], (3) to measure a second magnetic resonance signal generated from the voxel at a second time interval subsequent to the elapse of a predetermined time from the measurement of the first

magnetic resonance signal" {See figure 1 which shows this limitation}, "(4) to detect a magnetic resonant frequency F2 of water from a second magnetic resonance spectrum obtained by Fourier-transforming the second magnetic resonance signal" [See equation 6, and the entire reference in general which teaches how to delineate at least one or more multiple water signals by using a time delay and a function of a frequency parameter, to filter out the undesired fat signals. See also paragraphs [0007] through [0014], paragraphs [0029]-[0043] and paragraph [0081]," and (5) to calculate a time-varying rate of the magnetic resonant frequency of water" (i.e. a deblurred water only image) "on the basis of the F1 and F2" [See paragraphs [0038], [0081] and the abstract.].

7. With respect to **Claim 2**, **Moriguchi et al.,** teaches and shows "A magnetic resonance imaging system" [See figure 9] "comprising: means which generates a static magnetic field;" [See basic magnetic field generator 92 of figure 9] "gradient magnetic field generating means which generates a gradient magnetic field;" [See the gradient coils 96 of figure 9] "RF magnetic field generating means which generates an RF magnetic field;" [See RF antenna 106 of figure 9.] "measuring means which measures a magnetic resonance signal generated from a target;" [See the combination of the RF transmission reception unit 102, with image computer 108 and control computer 104 of figure 9.] "computing means which performs a computation on the magnetic resonance signal;" [See the combination of the image computer 108 and control computer 104 of figure 9.] "memory means which stores the magnetic resonance signal and the result of computation by the computing means;" [See paragraph [0084]] "and sequence control means which sets operating conditions to respective portions of the gradient magnetic field generating means"[See the combination of the control computer 104 gradient coil supply 98 the RF transmission reception unit 102 and the image computer 108 which interact to control the gradient coils 96.], **Moriguchi et al.,** teaches and shows that "the RF magnetic field generating means, the measuring means, the computing means and the memory means to control the operations of the respective portions, wherein the sequence control means includes control to irradiate the target with the RF magnetic

field at least once, measure the magnetic resonance signal generated after the irradiation of the RF magnetic field in a state in which the strength of application of the gradient magnetic field is approximately zero, and calculate magnetic resonance spectrum information from the measured magnetic resonance signal to thereby perform a magnetic resonance spectrum measurement," [See figures 1, and 9, paragraphs [0007] through [0014],paragraphs [0082] through [0084]. The examiner notes that figure 1 shows that the 1st and 2nd or more RF pulses applied may occur when the gradient is approximately zero because no gradients are indicated as being present in figure 1.] **Moriguchi et al.,** teaches and shows that "wherein the sequence control means performs control (1) to measure a first magnetic resonance signal generated from a measurement voxel at the magnetic resonance spectrum measurement at a first time interval," [See paragraphs [0010]-[0014], [0033]-[0037] and [0082]-[0084]] "(2) to detect a magnetic resonant frequency F1 of water from a first magnetic resonance spectrum obtained" [See paragraphs [0033] through equation 6 in paragraph [0037] "by Fourier-transforming the first magnetic resonance signal" [Se paragraph [0082]], (3) to measure a second magnetic resonance signal generated from the voxel at a second time interval subsequent to the elapse of a predetermined time from the measurement of the first magnetic resonance signal" {See figure 1 which shows this limitation}, "(4) to detect a magnetic resonant frequency F2 of water from a second magnetic resonance spectrum obtained by Fourier-transforming the second magnetic resonance signal" [See equation 6, and the entire reference in general which teaches how to delineate at least one or more multiple water signals by using a time delay and a function of a frequency parameter, to filter out the undesired fat signals. See also paragraphs [0007] through [0014], paragraphs [0029]-[0043] and paragraph [0081]," **Moriguchi et al.,** also teaches and shows from the written disclosure and the equations presented the ability of "(5) to estimate" (i.e. using the frequency maps as an approximation), "based on the F1 and F2, a time-varying rate of a magnetic resonant frequency of water at a measurement time at which the magnetic resonance signal is measured after the completion of measurement of the second magnetic resonance signal" [See figures 2, 9; the abstract and paragraphs [0007] through [0084]], Additionally, the mathematics taught throughout

the **Moriguchi et al.,** reference are utilized "(6) to calculate, using the estimated time-varying rate of the magnetic resonant frequency, a transmission frequency of the RF magnetic field or/and a received frequency at which the magnetic resonance signal generated from the voxel is received and measure the magnetic resonance signal generated from the voxel after the setting of the operating conditions of the RF magnetic field generating means or/and the measuring means, and (7) to perform said (6) repeatedly plural times subsequently to the completion of measurement of the second magnetic resonance signal." [See figures 2, 9; the abstract and paragraphs [0007] through [0084]],

8. With respect to **Claim 3**, **Moriguchi et al.,** teaches and shows "A magnetic resonance imaging system" [See figure 9] "comprising: means which generates a static magnetic field;" [See basic magnetic field generator 92 of figure 9] "gradient magnetic field generating means which generates a gradient magnetic field;" [See the gradient coils 96 of figure 9] "RF magnetic field generating means which generates an RF magnetic field;" [See RF antenna 106 of figure 9.] "measuring means which measures a magnetic resonance signal generated from a target;" [See the combination of the RF transmission reception unit 102, with image computer 108 and control computer 104 of figure 9.] "computing means which performs a computation on the magnetic resonance signal;" [See the combination of the image computer 108 and control computer 104 of figure 9.] "memory means which stores the magnetic resonance signal and the result of computation by the computing means;" [See paragraph [0084]] "and sequence control means which sets operating conditions to respective portions of the gradient magnetic field generating means"[See the combination of the control computer 104 gradient coil supply 98 the RF transmission reception unit 102 and the image computer 108 which interact to control the gradient coils 96.], **Moriguchi et al.,** teaches and shows that "the RF magnetic field generating means, the measuring means, the computing means and the memory means to control the operations of the respective portions, wherein the sequence control means includes control to irradiate the target with the RF magnetic field at least once, measure the magnetic resonance signal generated after the

irradiation of the RF magnetic field in a state in which the strength of application of the gradient magnetic field is approximately zero, and calculate magnetic resonance spectrum information from the measured magnetic resonance signal to thereby perform a magnetic resonance spectrum measurement," [See figures 1, and 9, paragraphs [0007] through [0014],paragraphs [0082] through [0084]. The examiner notes that figure 2 shows that the 1st and 2nd or more RF pulses applied may occur when the gradient is approximately zero because no gradients are indicated as being present in figure 1.] **Moriguchi et al.,** teaches and shows that "wherein the sequence control means performs control (1) and wherein the sequence control means performs, when the measurement of the magnetic resonance signal is performed repeatedly plural times, control (1) to execute a pre-scan" (i.e. an initial frequency map) "for measuring a magnetic resonant frequency of water each time the magnetic resonance signal is measured a predetermined number of times"[See paragraphs [0038] and [0046] through [0055], "(2) to detect a magnetic resonant frequency of water from a magnetic resonance spectrum obtained by Fourier-transforming the magnetic resonance signal obtained by the pre-scan" (i.e. the initial frequency map), and (3) to set, based on the magnetic resonant frequency detected in said (2), a transmission frequency of the RF magnetic field radiated into the target or/and a received frequency at the measurement of the magnetic resonance signal in the spectrum measurement sequence executed subsequently to the pre-scan." [See paragraphs [0007] through [0085], figures 1, 9 and the abstract

9. With respect to **Claim 4**, **Moriguchi et al.,** teaches and shows "A magnetic resonance imaging system" [See figure 9] "comprising: means which generates a static magnetic field;" [See basic magnetic field generator 92 of figure 9] "gradient magnetic field generating means which generates a gradient magnetic field;" [See the gradient coils 96 of figure 9] "RF magnetic field generating means which generates an RF magnetic field;" [See RF antenna 106 of figure 9.] "measuring means which measures a magnetic resonance signal generated from a target;" [See the combination of the RF transmission reception unit 102, with image computer 108 and control computer 104 of

figure 9.] “computing means which performs a computation on the magnetic resonance signal;” [See the combination of the image computer 108 and control computer 104 of figure 9.] “memory means which stores the magnetic resonance signal and the result of computation by the computing means;” [See paragraph [0084]] “and sequence control means which sets operating conditions to respective portions of the gradient magnetic field generating means”[See the combination of the control computer 104 gradient coil supply 98 the RF transmission reception unit 102 and the image computer 108 which interact to control the gradient coils 96.], **Moriguchi et al.,** teaches and shows that “the RF magnetic field generating means, the measuring means, the computing means and the memory means to control the operations of the respective portions, wherein the sequence control means performs, when the measurement of the magnetic resonance signal is performed repeatedly plural times, control (1) to execute a pre-scan” (i.e. a frequency map) “for measuring a magnetic resonant frequency of water each time the magnetic resonance signal is measured a predetermined number of times, (2) to detect a magnetic resonant frequency of water from a magnetic resonance spectrum obtained by Fourier-transforming the magnetic resonance signal obtained by the pre-scan, and (3) to set, based on the magnetic resonant frequency of water detected in said (2), a transmission frequency of the RF magnetic field radiated into the target or/and a received frequency at the measurement of the magnetic resonance signal in a pulse sequence executed subsequently to the pre-scan” (i.e. after the frequency map is obtained) [See paragraphs [0007] through [0085], figures 1, 9 and the abstract.]

10. With respect to **Claim 5**, **Moriguchi et al.,** teaches and shows "A magnetic resonance imaging system comprising: means which generates a static magnetic field; gradient magnetic field generating means which generates a gradient magnetic field; RF magnetic field generating means which generates an RF magnetic field; measuring means which measures a magnetic resonance signal generated from a target; computing means which performs a computation on the magnetic resonance signal; memory means which stores the magnetic resonance signal and the result of computation by the computing means; and sequence control means which sets

operating conditions to respective portions of the gradient magnetic field generating means, the RF magnetic field generating means, the measuring means, the computing means and the memory means to control the operations of the respective portions," for the same reasons as those already provided in the **rejections of claims 1-4** above, which need not be reiterated. **Moriguchi et al.,** also teaches and shows "wherein the sequence control means performs control (1) to execute a water suppression sequence for applying the RF magnetic field and the gradient magnetic field to the target to thereby suppress a signal of water, (2) to execute a spectrum measurement sequence for applying the RF magnetic field and the gradient magnetic field to the target to select and excite a predetermined voxel and measuring the magnetic resonance signal generated from the predetermined voxel, (3) to execute a pre-scan sequence for measuring a magnetic resonant frequency of water prior to said (1) and (2) being executed a predetermined number of times, where said (1) and (2) are performed repeatedly plural times, and (4) to, on the basis of the magnetic resonant frequency of water detected in said (3), set a transmission frequency of the RF magnetic field irradiated in the water suppression sequence and set a transmission frequency of the RF magnetic field irradiated to select and excite the predetermined voxel or/and a received frequency at the detection of the magnetic resonance signal generated from the predetermined voxel in the spectrum measurement sequence." {See paragraph [0034] and the detailed procedures of paragraphs [0007] through [0084] where the computer control of paragraphs [0082] through [0084] cause the excitations and selections of the various voxels in order to generate or suppress a specific component (i.e. either water of fat as desired based upon the multiple frequencies utilizes and the preliminary frequency maps, with either a single or multiple excitation coil system.}

11. With respect to **Claim 6**, **Moriguchi et al.,** teaches and shows "A magnetic resonance imaging system comprising: means which generates a static magnetic field; gradient magnetic field generating means which generates a gradient magnetic field; RF magnetic field generating means which generates an RF magnetic field; measuring means which measures a magnetic resonance signal generated from a target;

computing means which performs a computation on the magnetic resonance signal; memory means which stores the magnetic resonance signal and the result of computation by the computing means; and sequence control means which sets operating conditions to respective portions of the gradient magnetic field generating means, the RF magnetic field generating means, the measuring means, the computing means and the memory means to control the operations of the respective portions," for the same reasons as those already provided in the **rejections of claims 1-4** above, which need not be reiterated. **Moriguchi et al.,** also teaches and shows " wherein the sequence control means performs control (1) to execute a water suppression sequence for applying the RF magnetic field and the gradient magnetic field to the target to thereby suppress a signal of water," [See paragraphs [0007] through [0084] with respect to the selection or suppression of the water signal.] "(2) to execute a spectrum measurement sequence for applying the RF magnetic field and the gradient magnetic field to the target to select and excite a predetermined voxel and measuring the magnetic resonance signal generated from the predetermined voxel," [See paragraphs [0082] through [0084], figures 9, 1 and 3; and paragraphs [0033] through [0050] with paragraphs [0007] through [0014]] "(3) to, when said (1) and (2) are performed repeatedly plural times, detect a water signal peak from a magnetic resonance spectrum obtained by Fourier-transforming the magnetic resonance signal obtained by the execution of said (1) and (2), each time said (1) and (2) are executed a predetermined number of times to calculate a signal strength of the water signal peak," [See figure 4 with the disclosure of paragraphs [0007] through [0084]] "(4) to determine that a magnetic resonant frequency of water has been shifted" (i.e. is blurred or is off resonance) when the calculated signal strength of the water signal peak is increased to a predetermined value or more" [See the disclosure of paragraphs [0007] through [0084] which concern checking for and eliminating the off resonance and blurring effects), "(5) to execute a pre-scan" (i.e. an initial frequency map) "for measuring the water magnetic resonant frequency when the water magnetic resonant frequency is judged to have been shifted in said (4)" [See the tentative water image in figure 4 and the disclosure of paragraphs [0007] through [0084]], "(6) to detect a magnetic resonant

frequency of water from a magnetic resonance spectrum obtained by Fourier-transforming the magnetic resonance signal obtained in the pre-scan, and (7) to, in a pulse sequence executed subsequently to the pre-scan on the basis of the magnetic resonant frequency of water detected in said (6), set a transmission frequency of the RF magnetic field irradiated in the water suppression sequence, or/and set a transmission frequency of the RF magnetic field irradiated to select and excite the predetermined voxel in the spectrum measurement sequence, or/and set a received frequency at the detection of the magnetic resonance signal generated from the predetermined voxel." [See figures 1 through 9, the abstract, and paragraphs [0007] through [0084] as the steps recited are a main teaching, taught in various manners throughout the **Moriguchi et al.,** disclosure.

12. **Claims 1-6** are rejected under **35 U.S.C. 102(e)** as being **anticipated** by **Moriguchi et al.,** US patent 7,042,215 B2 issued May 9th 2006 which corresponds to **Moriguchi et al.,** US patent application publication 2005/0033153A1 published Feb. 10th 2005, with an effective US priority date of April 25th 2003. Therefore the same reasons for rejection, that are applied above, also apply to the issued **Moriguchi et al.,** US patent 7,042,215 B2 and need not be reiterated.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

14. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is **(571) 273-8300**.

15. Information regarding the status of an application may be obtained from the Patent Application information Retrieval (PAIR) system Status information for published applications may be obtained from either Private PMR or Public PMR. Status information for unpublished applications is available through Private PMR only. For more information about the PMR system, see http://pair-direct.uspto.gov. Should you

have questions on access to the Private PMR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TAF
July 9, 2007
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